REMARKS

The application has been reviewed in light of the final Office Action dated October 5, 2007 and the Advisory Action dated January 23, 2008. By this Amendment, claims 1, 6, 9 and 10 have been canceled, without prejudice or disclaimer, and claims 2 and 8 have been amended by rewriting them in independent form, and claims 7, 11 and 12 have been amended to depend from independent claim 8. Accordingly, claims 2-5, 7, 8 and 11-19 are pending, with claims 2, 8 and 15 being in independent form.

Claims 1-5 were rejected under 35 U.S.C. § 102(b) as purportedly anticipated by U.S. Patent No. 5,832,051 to Lutz. Claims 1-19 were rejected under 35 U.S.C. & 102(e) as purportedly anticipated by U.S. Patent No. 6,381,487 to Flohr.

Applicant has carefully considered the Examiner's comments and the cited art, and respectfully submits that independent claims 2, 8 and 15 are patentable over the cited art, for at least the following reasons.

Lutz, as understood by Applicant, proposes an approach for using a CT apparatus to examine individual cardiac phases of a patient, wherein an X-ray beam is rotated around and penetrates the heart of a patient from various angular positions, and the cardiac rhythm of the patient is determined in order to set the rotation time of the X-ray beam around the patient and to produce various control signals synchronized to the cardiac rhythm of the patient, so that radiological exposures of various cardiac phases are possible for the duration of a measurement interval.

It was contended in the Office Action that Lutz, column 2, lines 18-25, discloses detecting the static cardiac time phase based on correlation data between the heartbeat information and the static cardiac time phase that are previously determined to each

subject.

Lutz, column 2, lines 18-25, states as follows:

> The cycle time of the cardiac rhythm of the patient is determined and ***setting of the rotation time of the X-ray beam rotating about the patient*** so that the rotation time is made larger or smaller, by a predeterminable measurement interval, than the cycle time of the cardiac rhythm of the patient, so that, dependent on the rotation time, after a few rotations there is a phase difference of 360° between the rotating X-ray beam and the patient's cardiac rhythm. ...

Thus, Lutz proposes controlling the rotation of the X-ray beam so that after a few rotations there is a phase difference of 360° between the rotating X-ray beam and the patient's cardiac rhythm. Such approach depends on determining the cycle time of the cardiac rhythm of the patient.

Lutz, contrary to the contention in the Office Action, does not disclose or suggest, however, detecting the static cardiac time phase based on ***correlation data between the heartbeat information and the static cardiac time phase that are previously determined to each subject***, as provided by the subject matter of claim 2 of the present application.

Flohr, as understood by Applicant, proposes an approach for producing CT images of a body region, such as the heart, which periodically moves with resting and motion phases, wherein data corresponding to a number of projections are analyzed to determine whether each projection was acquired during a resting or motion phase, and only those data that were acquired during a resting phase are employed for image reconstruction.

It was contended in the Office Action that Flohr, column 2, lines 42-54, discloses detecting the static cardiac time phase based on correlation data between the heartbeat information and the static cardiac time phase that are previously determined to each subject.

Flohr, column 2, lines 42-54, states as follows:

> In one version of the invention, for classification of the measured data, the ECG signal of the respective patient is utilized. ***The correlation of the ECG signal with the actual mechanical movement of the heart*** can, first, ensue with automatic or interactive evaluation of measured data and/or CT images of a reference examination, i.e. a number of test projections, and evaluation of the synchronously acquired ECG signal. In this way, the patient-specific delay between R-wave of the ECG signal and the trigger time of the radiator can also be quantitatively acquired for ECG-triggered CT exposures, leading to a significantly improved imaging and a significantly more efficient examination execution. ...

Thus, Flohr merely proposes performing a correlation of the ECG signal with the actual mechanical movement of the heart.

Flohr, like Lutz, does not disclose or suggest, however, detecting the static cardiac time phase based on ***correlation data between the heartbeat information and the static cardiac time phase that are previously determined to each subject***, as provided by the subject matter of independent claim 2 of the present application.

Accordingly, applicant respectfully submits that independent claim 2 and the claims depending therefrom are patentable over the cited art.

Regarding claim 8, it was contended in the Office Action that Flohr, column 5, line 53 through column 6, line 7, discloses calculating an integrated value of a CT value of each of the plurality of sample tomographic images in a predetermined region and selects a sample tomographic image with a smallest fluctuation of the integrated value of the CT value.

Flohr, column 5, line 53 through column 6, line 7, states as follows:

> Images 1 through 4 are shown in FIG. 7, these having been reconstructed from the projections n ε [$N_{o,i}$, $N_{o,i}$ +N-1] with the start projections $N_{o,i}$ (i=1(1)4) marked in FIG. 6. The images demonstrate the significant correlation of the introduced error criterion $\sigma_C(n)$ with the extent of motion artifacts. Image 1 and image 2 show clear

> double contours of the heart chambers, whereas image 3 and image 4 exhibit hardly any motion artifacts.
>
> From the projection interval $[N_1,N_2]$, the resting phase of the heart identified in FIG. 8 by hatching, can be defined from the projection interval $n \varepsilon [N_1, N_2 +N]$ in the time interval $[T_1\ T_2]=[T(N_1),T(N_2 +N)]$. The constants C_1 and C_2 according to (1) are again used for parametrization.
>
> Apart from the automatic analysis of complementary data, an automatic interpretation of reconstructed images is also possible in the scope of the invention. ***When, for example, the differences of images succeeding one another in time exhibit a negligible extent of line artifacts or double contours, these images can be allocated to a resting phase of the heart. An uninterrupted sequence of images evaluated in this way as being low in motion artifacts then defines a resting phase of the heart.***

Thus, Flohr merely proposes defining the resting phase of the heart using a sequence of images wherein the differences of images succeeding one another in time exhibit a negligible extent of line artifacts or double contours.

Flohr does not disclose or suggest, however, ***calculating an integrated value of a CT value*** of each of the plurality of sample tomographic images in a predetermined region and ***selects a sample tomographic image with a smallest fluctuation of the integrated value of the CT value***, as provided by the subject matter of independent claim 8 of the present application.

Accordingly, applicant respectfully submits that independent claim 8 and the claims depending therefrom are patentable over the cited art.

Regarding claim 15, it was contended in the Office Action that Flohr, column 2, lines 13-35, discloses detecting a static cardiac time phase with a small amount of motion artifacts in a predetermined portion of the subject based on heartbeat information acquired in association with the projection data, and generating the tomographic image by reconstructing projection data corresponding to the detected static cardiac time phase.

Flohr, column 2, lines 13-35, states as follows:

> The above object is achieved in accordance with the principles of the present invention in a method and an apparatus for producing CT images of a body region which periodically moves with resting and motion phases, wherein an x-ray source focus is moved around the body of the subject under examination for registering data used for producing the CT images, and wherein a number of projections are registered, during at least one revolution of the x-ray source focus around the subject, preferably, and during a time duration that is at least equal to a cycle of the movement of the body region, and wherein ***the projection data are analyzed directly to determine whether the data were acquired during a resting phase or a motion phase, and wherein only those data are employed for image reconstruction that were found to be acquired during a resting phase.***
>
> The inventive method is thus an automatic method wherein the registered measured data are patient-specifically classified by analysis of the measured data themselves to determine whether they are usable, i.e. were acquired during a resting phase of the heart, or are unusable, i.e. were acquired during a motion phase, with only measured data acquired during a resting phase of the heart being utilized for the image reconstruction. ...

Flohr merely proposes analyzing data corresponding to a number of projections to determine whether each projection was acquired during a resting or motion phase, and using only data that were acquired during a resting phase, for image reconstruction.

Flohr does not disclose or suggest detecting a static cardiac time phase with a small amount of motion artifacts in a predetermined portion of the subject based on heartbeat information acquired in association with the projection data, and generating the tomographic image by reconstructing projection data corresponding to the detected static cardiac time phase, as provided by the subject matter of independent claim 15 of the present application.

Accordingly, applicant respectfully submits that independent claim 15 and the claims depending therefrom are patentable over the cited art.

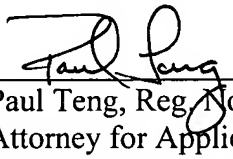
In view of the remarks hereinabove, Applicant submits that the application is now in

condition for allowance, and earnestly solicits the allowance of the application.

If a petition for an extension of time is required to make this response timely, this paper should be considered to be such a petition. The Patent Office is hereby authorized to charge any fees that are required in connection with this amendment and to credit any overpayment to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Respectfully submitted,



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